CLAIMS

1. A fluid flow control valve provided with means for detecting and quantifying valve seat leakage when the valve is in its closed position, said means including first means for measuring pressure immediately upstream of the seat, an orifice of known, fixed dimensions present when the valve is in its closed position and located downstream of the seat, through which orifice any fluid leaking past the seat flows, second means for measuring pressure between the seat and the orifice and third means for measuring pressure immediately downstream of the orifice.

2. A fluid flow control valve according to claim 1 wherein the orifice is an annular orifice defined between a cylindrical extension of the valve closure extending downstream of the seat and a cylindrical wall of the outlet of the valve defined by the valve body when the valve is in its closed position.

3. A fluid flow control valve according to claim 1 wherein the orifice is formed in a piston ring that is located between a cylindrical extension of the valve closure and a cylindrical wall of the outlet of the valve when the valve is in its closed position.

4. A fluid flow control valve according to claim 1 wherein the orifice is formed by a tortuous path between a cylindrical extension of the valve closure and a cylindrical wall of the outlet of the valve when the valve closure is in the closed position.

5. A fluid flow control valve according to claim 2 wherein, as the valve is opened, the cylindrical extension withdraws from the outlet such that, at least when the valve is fully open, the orifice ceases to be present and so does not interfere with the flow of fluid through the valve.

6. A fluid flow control valve according to claim 3 wherein, as the valve is opened, the cylindrical extension withdraws from the outlet such that, at least when the valve is fully open, the orifice ceases to be present and so does not interfere with the flow of fluid through the valve.

7. A fluid flow control valve according to claim 4 wherein, as the valve is opened, the cylindrical extension withdraws from the outlet such that, at least when the valve is fully open, the orifice ceases to be present and so does not interfere with the flow of fluid through the valve.

8. A fluid flow control valve according to claim 1 wherein each means for measuring pressure is a pressure transducer.

9. A fluid flow control valve according to claim 8 wherein each transducer is mounted externally of the valve with a respective fluid path connecting the pressure transducer to the region where the pressure is to be measured.

10. A fluid flow control valve according to claim 9 wherein the fluid paths are bores formed in the valve closure which, at their respective lower ends, open into those regions and at their respective upper ends interface with the respective pressure transducers mounted on the valve closure.

11. A fluid flow control valve according to claim 10 wherein the valve closure is a plunger or a screw-threaded spindle.

12. A fluid flow control valve according to claim 8 wherein one or more pressure transducers is mounted separately from the valve closure in the

regions where the pressure is to be measured or connected to those regions by respective fluid paths.

13. A fluid flow control valve according to claim 8 wherein electrical outputs of the pressure transducers are fed to a processor programmed to calculate and give the desired leakage information.

14. A fluid flow control valve according to claim 1 wherein the first means for measuring pressure immediately upstream of the seat is omitted and said means for detecting and quantifying valve seat leakage when the valve is in its closed position determines the mass flow through any leak across the orifice.

15. A method for quantifying valve seat leakage when a fluid flow control valve is closed, the method comprising the steps of providing a fixed orifice of known size downstream of the valve seat when the valve is closed through which orifice any fluid leaking past the seat flows, measuring a first pressure upstream of the seat, measuring a second pressure between the seat and the orifice, measuring a third pressure immediately downstream of the orifice, using the second and third pressure to calculate flow through the orifice, and using the first and second pressures and the calculated flow through the orifice to determine the size of a leak path across the seat.

16. A method according to claim 15 wherein the first, second and third pressures are measured by respective pressure transducers associated with a valve closure movable relative to the valve seat.

17. A method according to claim 15 wherein the first, second and third pressures are used to provide continuous monitoring of valve seat leakage.

18. A method according to claim 15 wherein the step of measuring the first pressure upstream of the seat is omitted and the method is employed to measure the mass flow through any leak across the orifice.

19. A method for quantifying valve seat leakage when a fluid flow control is closed, the method comprising the steps of providing, at least when the valve is closed, a fixed orifice of known sized downstream of the valve seat through which orifice any fluid leaking past the seat flows, measuring a first pressure between the seat and the orifice, measuring a second pressure immediately downstream of the orifice and using the first and second pressures to calculate flow through the orifice and hence the mass flow through any leak across the valve seat.

20. A fluid flow control valve provided with means for detecting and quantifying valve seat leakage when the valve is in its closed position, said means including an orifice of known, fixed dimensions present at least when the valve is in its closed position and located downstream of the seat, through which orifice any fluid leaking past the seat flows, first means for measuring pressure between the seat and the orifice and second means for measuring pressure immediately downstream of the orifice.